1.7 Specifications:

Table I

GENERAL:	
Frequency Range:	3–15 MHZ – no operation 5250–5750 KHz and 10500–11500 KHz
Channels:	4 within 5% of frequency
Stability:	meets FCC requirements
Clarifier Range:	±.003% both receive and transmit
Mode of Operation:	upper sideband
Duty Cycle:	continuous
Antenna Requirements:	50 ohms unbalanced
RECEIVER:	
Sensitivity:	.5uv for 10db S+N to N ratio
Selectivity:	2.7 KHz @ 6db points
Unwanted SB Rejection:	–50db @ 1 KHz
Image/Spurious Rejection:	–65db minimum
Audio Output:	1 watt to internal speaker
AVC:	fast attack, slow release
Dynamic Range:	less than 3db change in output for inputs from 3uv to 100,000uv
Type:	superhetrodyne single conversion
If Frequency:	5.55 MHz
TRANSMITTER:	
Power Output:	250 watts output
Carrier Suppression:	–40 db
Hammonic Suppression:	–40db
IM Distortion:	–30db
Undesired SB Suppression:	–50db
ALC Control:	10db rise in audio input causes less than 1db change in RF output
Audio Bandwidth:	300–3000 Hz at 6db points
Microphone:	supplied
MECHANICAL:	
Dimensions:	5½" x 11½" x 10½" (HWD)
Weight:	15 lbs.
Controls:	channel select, clarifier, audic gain/on–off, all others internal
	Includes microphone and one crystal. (Frequency must be specified.)

1.8 Tube and Semi-conductor Compliment:

The following table lists the tubes and semi-conductors used in the Comm 1C Transceiver.

Table 2

TYPE	USE	TYPE	USE
6LB6	V1 & V2 PA Amplifier	2N3855	Q1 Osc. Buffer Amp. (Receive and Transmit)
6EJ7	V4 Transmit Mixer		
12 HG7	V3 RF Driver (transmit) RF Amp. (receive)	3N128	Q2 1st Oscillator (Receive and Transmit)
6JV8	V5A Meter Amplifier	2N2926o	Q3 AVC Amplifier
	V5B Audio Frequency Output	2N2926o	Q4 Microphone Amplifier
6HG8	V6 Receive Mixer	2N2926o	Q5 Microphone Amplifier
12BA6	V7 1st IF Amplifier	2N2926g	Q6 Balance Modulator
	(Receive and Transmit)	2N2926g	Q7 Balance Modulator
12BA6	V8 2nd IF Amplifier	2N2926g	Q8 ALC Amplifier
6GX6	V9 Product Detector (Receive) Carrier Osc. (Transmit)		

Power Requirements
900 Vdc @ 445 ma (10% regulation 80 to 445 ma)
325 - 350 Vdc @ 200 ma
-100 Vdc @ 30ma
12 V dc @ 200ma
12 V ac/dc @ 5 A

3.4 Transceiver Operation - Receive Mode:

Perform the following steps to place the Comm 1C in operation:

A. Set the CHANNEL Selector Switch to desired channel.

B. Set the CLARIFIER Control to 0.

C. Apply power to the unit by rotating the AUDIO GAIN Control in a clockwise direction. Adjust this control for a comfortable listening level.

D. Adjust CLARIFIER control to the exact received signal frequency. The effects of tuning are reflected as a raising or lowering in pitch of the audio tones. Correct adjustment prevails when the received voice sounds natural.

E. The receiver is switched to stand-by automatically when the transmitter is energized and returns to operation when the transmitter is de-energized. The audio output of the receiver at the speaker is automatically silenced when the phone plug of the headset is inserted into the PHONE JACK.

3.5 Transceiver Operation - Transmit Mode:

A. Depress the push to talk switch on the microphone. This will energize the transmitter and mute the receiver.

B. Adjust the BIAS on the final amplifier tubes. To make this adjustment, place the microphone in your left hand with the front of the microphone toward your palm. Now depress the push to talk button on the microphone and adjust the BIAS dontrol, on the back panel of the transceiver, for a reading of S-1 on the front panel meter.

C. To make a normal SSB transmission, depress the push to talk button on the microphone and speak into the microphone in a normal tone of voice. The microphone should be held approximately three inches from the operator's lips. When the transmission is complete, release the push to talk button. This will return the transceiver to a receive condition.

D. The Comm 1C is now ready for normal operation.

4.5 Alignment - General:

The Galaxy COMM 1C transceiver has been accurately aligned and calibrated at the factory and, with normal usage, will not require re-alignment for extended periods of time. Service or replacement of a major component may require subsequent re-alignment, but under no circumstances should re-alignment be attempted unless the malfunction has been analyzed and definitely traced to misalignment. Alignment should only then be performed by a competent technician using the proper test equipment.

4.6 Test Equipment Required:

The following test equipment will be necessary in completing the alignment procedures:

A. R.F. Signal Generator 50 KHz to 15 MHz (Hewlett Packard 606A or equivalent)

B. Vacuum Tube Voltmeter (Hewlett Packard 410 B or equivalent)

C. Frequency Meter, Counter, or other frequency determining device to accurately check operating frequency.

D. R.F. Dummy Load 50Ω non-inductive resistance capable of dissipating 250w R.F. Power (Waters Model 334A or equivalent)

4.7 Alignment:

Place transceiver in an operating condition and allow sufficient time for transceiver to warm up.

4.8 "S" Meter Zero:

The "S" meter cannot be adjusted below zero. To zero the "S" meter adjust the meter up-scale, then adjust the meter down scale stopping at zero.

The meter adjustment control is R-39 and is located on PC board 200-67.

4.9 I.F. Alignment:

Connect an RF Signal Generator to the antenna jack on the rear panel of the transceiver. Set the channel selector switch to any used channel. A channel frequency close to 5.550 MHz would be preferred.

Adjust the RF signal generator to the desired channel frequency.

NOTE: Adjust the output level and alternator controls, as necessary, to maintain a mid-scale reading on the "S" meter when performing these adjustments.

Adjust the cores of L6, L7, L8 and the bottom core of T-2 for MAXIMUM indication on the "S" meter.

Set the RF generator to the I. F. frequency of 5.550 MHz.

Adjust the core of L5 for MINIMUM indication on the "S" meter.

NOTE: Adjust the RF generator alternator control to maintain a mid-scale reading while making this adjustment.

When adjusting the I. F. coils L6, L7, L8 and the Balanced Modulator transformer bottom core, T-2, we use an RF frequency. It will be necessary to adjust the RF signal generator for a strong signal level to perform this alignment.

Coil L-5 is the I. F. frequency trap. This coil must be adjusted at the I. F. frequency of 5.550 MHz. If it is not properly adjusted any received frequency of 5.550 MHz will race directly through the transceiver.

4.10 RF Alignment:

Alignment of the RF section will be performed on an un-used channel in the transceiver. If all channels are used, remove a crystal from one channel then place the CHANNEL SELECTOR switch in this position.

Connect the RF signal generator to the antenna jack on the rear panel of the transceiver. Set the RF generator on a frequency near the center of the RF band-pass, that is, if your lowest operating frequency is 4084 KHz and the highest operating frequency is 4684 KHz. Then set your RF generator to 4384 KHz. It is not necessary that the RF generator be exactly on this frequency but it should be close.

Set the RF output of the RF generator at 100,000 micro-volts.

Attach the AC probe of a VTVM to the junction of R-13 and C-24.

NOTE: The output of the RF generator must remain at 100,000 micro-volts. If the needle on the VTVM reads too low or too high, adjust the range switch on the VTVM to maintain an approximate mid-scale reading. This will be approximately 3 VRMS.

Adjust the core of L4 for MAXIMUM indication on the VTVM.

Adjust the core of L3 for MINIMUM indication on the VTVM.

Attach the VTVM AC probe to the junction of R-13 and C-15. This will be approximately 30 VRMS.

Adjust the core of L2 for MAXIMUM indication on the VTVM.

Adjust the core of L1 for MINIMUM indication on the VTVM.

Adjustment of these cores have established the operating bandswitch of the transceiver. DO NOT re-adjust in any succeeding alignment.

4.11 Transmitter Alignment:

Disconnect the RF generator and connect a Dummy Load Wattmeter to the antenna jack on the rear panel. Leave the CHANNEL SELECTOR on the un-used channel or the channel from which you have removed the crystal if all your channels are used.

Depress the PTT (push to transmit) button on the microphone to place the transceiver in a transmit condition.

Adjust the bias control, on the rear panel, for an S1 reading on the "S" meter and release the PTT (push to transmit) buttonon the microphone.

Re-install the crystal, if one has been removed, and place the CHANNEL SELECTOR switch in a position that has a crystal installed (operating channel). Select the channel that is nearest to the center of the RF bandpass.

Attach an audio generator to the top of R-65. Set the generator frequency to 1000 Hz and the generator output level to approximately 3 VRMS.

CAUTION: Be extremely careful when adjusting LOAD and TUNE controls as HAZARDOUS VOLTAGE is present.

Do not key the transceiver longer than 5 seconds in any 30 second period when performing the following adjustments.

Key the transceiver with the microphone PTT button. If any "S" meter reaching, other than bias condition is showing, QUICKLY adjust the TUNE CONTROL, C-2, for minimum (dip) indication on the "S" meter.

Key the transceiver and adjust the top core of T-2 for MAXIMUM "S" meter reading. Reduce the output level, if necessary, to remain mid-scale on the "S" meter.

Adjust the Audio Generator output level until the "S" meter "peak", re-adjust C-2 for minimum meter indication. If the "S" meter remains greater than -30 or less than full scale, no further TUNE or LOAD adjustments are necessary. If not, increase or decrease the LOAD control, C-1, (clockwise increase, counter-clockwise decrease) and re-adjust the TUNE control, C-2, until the Audio Generator "peak" occurs within range.

CAUTION: Always insure that the TUNE control, C-2, is adjusted last. (Dip) When transmitter adjustment is cimplete you should read 200-250 W on the wattmeter.

4.12 Carrier Crystal Alignment:

Connect the Audio Generator to the top of R-65.

Set the Audio Generator frequency to 1000 Hz.

The Dummy Load Wattmeter should still be connected to the Antenna jack. Key the transceiver using the microphone PTT button.

Adjust the Audio Generator output level until 100 W is indicated on the Wattmeter.

Re-adjust the Audio Generator frequency for 350 Hz. The Wattmeter should now read 25 W. If not, adjust C-104 on the I. F. PC Board for 25W.

Repeat until 100 W at 1000 Hz and 25 W at 350 Hz occur without changing the Audio Generator output lever or C-104.

4.13 Carrier Suppression Adjustment:

Attach a TEE connector to the antenna jack of the transceiver. Connect the Dummy Load Wattmeter to one side of the TEE connector. Attach the AC probe of the VTVM to the other side of the TEE connector.

Key the transceiver using the PTT button on the microphone. Adjust R-59 and R-62 alternately for minimum indication on the VTVM. A reading of less than 1.0 VRMS should be obtained.

4.14 Microphone Gain Adjustment:

Connect the Dummy Load Wattmeter to the antenna jack or the transceiver. Speaking directly into the microphone, in a normal voice, adjust R-65 so that the meter peak does not exceed S-9 on "S" meter.

4.15 Frequency Adjustment:

Attach a TEE connector to the Antenna jack on the transceiver. Connect a Dummy Load Wattmeter to one side of the TEE connector.

Connect a Frequency Counter, through a suitable pad, to the other side of the TEE connector.

Insure that the CLARIFIER control is mid-range.

Attach an audio generator to the top of R-65 and set the frequency for 1000 Hz.

Key the transceiver using the PTT button on the microphone. Adjust the Audio Generator output level so that the transceiver delivers 25-35 W as shown on the Dummy Load Wattmeter. This is normally sufficient output power to insure an accurate count with most Frequency Counters.

Place the Channel Selector in channel one position and adjust C-42 until the Frequency Counter indicates the calculated carrier frequency.

SECTION V

ADJUSTMENT -- INTERNAL CONTROLS

5.1 Frequency Correction:

If it has been determined that the transceiver is off-frequency, or if a high-stability transmitter frequency kit has been newly installed, reset the frequency or frequencies affected in the following manner.

This procedure assumes that the transceiver is operating properly except that the transmit frequencies are off.

1. Turn the transceiver off.

2. Connect one arm of an M-358 T-connector to the antenna jack of the transceiver. Connect a Waters Dummy Load Wattmeter 334A or equivalent to the other arm of the T-connector.

3. Connect a RF VTVM to the leg of the T-connector. Set the voltmeter on the 10V rms scale.

4. Remove the top cover of the transceiver and locate R65, R59, and R62 on the RF circuit board (220-68).

5. Turn blue knob pot R65 (mic gain) to maximum counter-clockwise (off).

6. Turn the transceiver on and allow it to warm up for at least five minutes.

7. Key the transmitter with the microphone PTT button.

8. Allow the RF meter to settle down. If the carrier output reads less than 3V rms, alternately adjust blue knob, pot R59 and R62, until a 3V rms reading is obtained.

9. Release the PTT button.

10. Turn the transceiver off.

11. Disconnect the RF VTVM from the T-connector.

12. Attach a frequency counter through a suitable pad to the leg of the T-connector.

CAUTION

If a suitable pad it not used and R65 is left on, the frequency counter may be damaged by having excess RF energy applied to it.

13. Turn the transceiver on and allow it to warm up a minimum of thirty minutes to insure high-accuracy settings.

14. Key the transceiver with the microphone PTT button.

15. If the high-stability transmitter frequency kit has <u>not</u> been installed, set the CLARIFIER control at mid-range.

16. The capacitors that control channel frequency are located on the HF Oscillator circuit board (200-66). They are:

    C42 - Channel 1
    C43 - Channel 2
    C44 - Channel 3
    C45 - Channel 4

17. Adjust the appropriate crystal trimmer with a non-inductive adjustment tool until a readout of the calculated carrier frequency is obtained on the frequency counter.

18. Release the PTT button.

19. Turn the transceiver off.

20. Disconnect the frequency counter.

The transceiver must now have carrier suppression and microphone gain re-adjusted as explained and in the order given below.

5.2 Carrier Suppression:

This procedure is used as needed, or following the frequency correction procedure above:

1. Turn the transceiver off.

2. Connect one arm of a M-358 T-connector to the antenna jack of the transceiver. Connect a Waters Dummy Load Wattmeter 334A or equivalent to the other arm of the T-connector.

3. Connect a RF VTVM to the leg of the T-connector. Set the voltmeter on the 3VAC rms scale.

4. Locate R65, R59, and R62 on the RF circuit board (200-68).

5. Turn the blue knob pot R65 (mic gain) to maximum counter-clockwise (off).

6. Turn the transceiver on and allow it to warm up for at least five minutes.

7. Key the transmitter with the microphone PTT button.

8. Alternately adjust blue knob, pots R59 and R62, until a minimum reading is obtained on the VTVM. This reading should be less than 1V rms.

9. Release the PTT button.

10. Turn the transceiver off.

11. Disconnect the VTVM.

The transceiver must now have the microphone gain re-adjusted as explained below.

5.3 Microphone Gain:

This procedure is used as needed, or following the carrier suppression adjustment procedure above.

1. Turn the transceiver off.

2. Connect a Waters Dummy Load Wattmeter 334A or equivalent to the antenna jack.

3. Remove the top cover of the transmitter and locate R65 on the RF circuit board (220-68).

4. Turn the transceiver on and allow it to warm up for at least five minutes.

5. Key the transmitter with the microphone PTT button and speak into the microphone in a normal speaking manner.

6. While speaking into the microphone, adjust R65 for a reading of S-9 on the front panel meter. If R65 is advanced too far, the excess mic gain will cause "flat-topping" and resultant distortion of the transmitted signal.

7. Release the PTT button.

8. Turn the transceiver off.

9. Disconnect the dummy load.

10. Replace the top cover.

11. Connect the coax connector from your antenna system to the antenna jack.

Your COMM 1C transceiver is ready for operation.

SECTION VI

CRYSTAL ORDERING INFORMATION
HF OSCILLATOR

Replacement or additional channel crystals may be ordered from Hy-Gain, or directly from Sentry Manufacturing Co., or from a crystal manufacturer of your choice. In ordering crystals, please give all the information required. The high-stability, channel crystals are not interchangeable with the standard, channel crystals and vice versa. Therefore, you must give the correct information for your transceiver.

6.1 From Hy-Gain or from Sentry Manufacturing Co.:

Standard, channel crystals

Quantity	—	_____
Description	—	Hy-Gain/Galaxy #780048
Frequency	—	_____kHz, operating or carrier (specify)

High-stability, channel crystals

Quantity	—	_____
Description	—	Hy-Gain/Galaxy #780056
Frequency	—	_____kHz, operating or carrier (specify)

Allow approximately three weeks for delivery.

6.2 From other crystal manufacturers:

Standard, channel crystals

Quantity	—	_____
Frequency	—	____kHz
Type	—	HA
Calibration tolerance	—	± .001% at 25° C
Calibration temperature tolerance	—	± .0005% at 0° C to + 50° C
Drive level	—	2 mw
Holder	—	HC 25
Circuit load	—	32 pF
ESR maximum	—	40 ohm

High-stability, channel crystals

Quantity	—	_____
Frequency	—	____kHz
Type	—	HA
Calibration tolerance	—	± .001% at 25° C
Calibration temperature tolerance	—	± .0005% at -10° C to + 60° C
Drive level	—	1 mw
Holder	—	HC 25
Circuit load	—	32 pF
ESR maximum	—	40 ohm

6.3 Determine Crystal Frequency.

Use this formula to determine crystal frequency for USB operation when ordering crystals from other manufacturers:

carrier frequency = desired operating frequency + 5550.00 kHz

Example:

desired operating frequency	4,467.50 kHz
plus	5,550.00 kHz
crystal (carrier) frequency required	10,017.50 kHz or 10.017500 MHz

SECTION VII

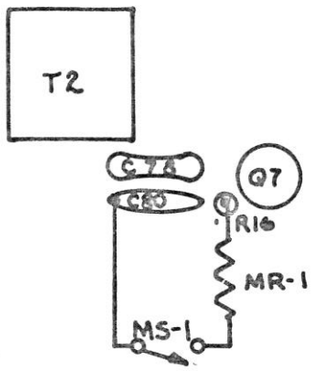
CARRIER INSERTION MODIFICATION *Installed*

7.1 General:

To provide carrier insertion for antenna SWR check frequency measurement or transceive re-alignment. The following modification may be performed. This modification should be performed by a competent technician. This modification will provide 20-40 W of output power.

7.2 Parts Required:

MS-1	Momentary on push button or toggle switch
MR-1	200K ~ 1/2 W 10% resistor



7.3 Switch Installation:

Install MS-1 on the front panel or chassis bottom cover as close to the effected circuit as possible.

7.4 Resistor Installation:

Attach resistor MR-1 and wiring as shown on instruction drawing. Keep resistor leads and wiring as short as possible.

7.5 Operation:

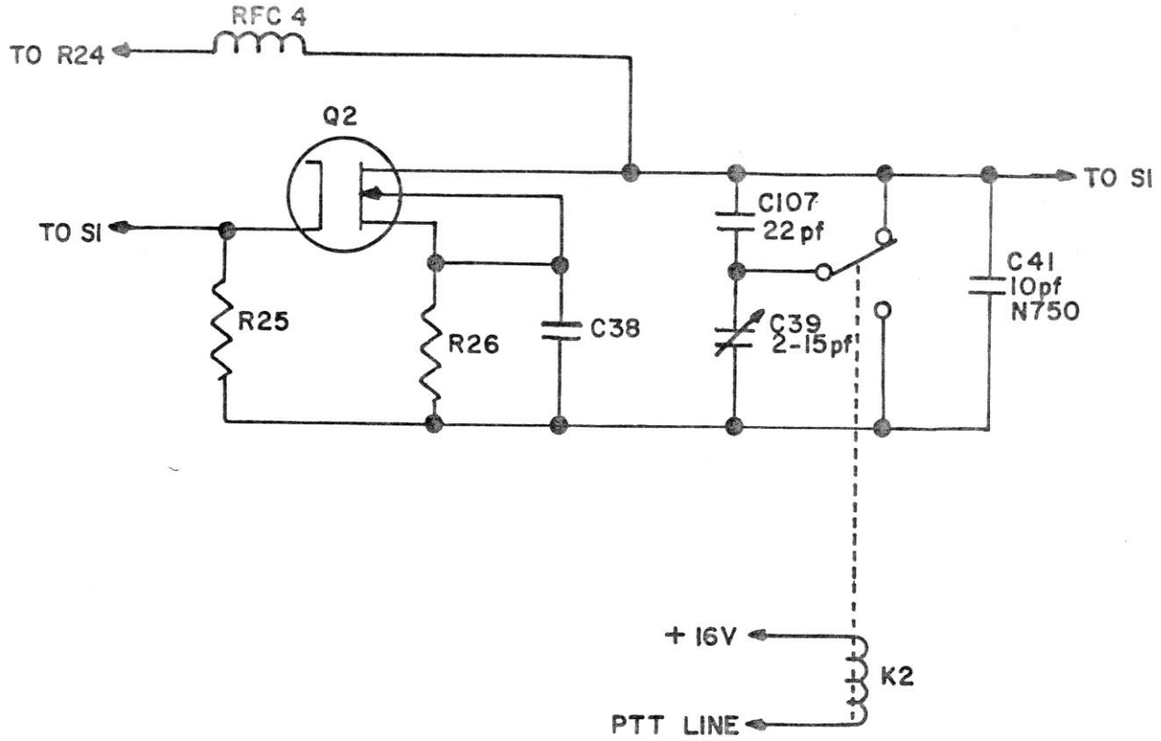
Place the COMM 1C in an operating condition and depress the PTT button on the microphone. Now depress MS-1 for carrier insertion.

NOTE: It is not recommended that the power output exceed 50 W or be sustained for longer than 30 seconds. Severe damage to the final amplifier tubes will result. This damage is not covered by the warranty.

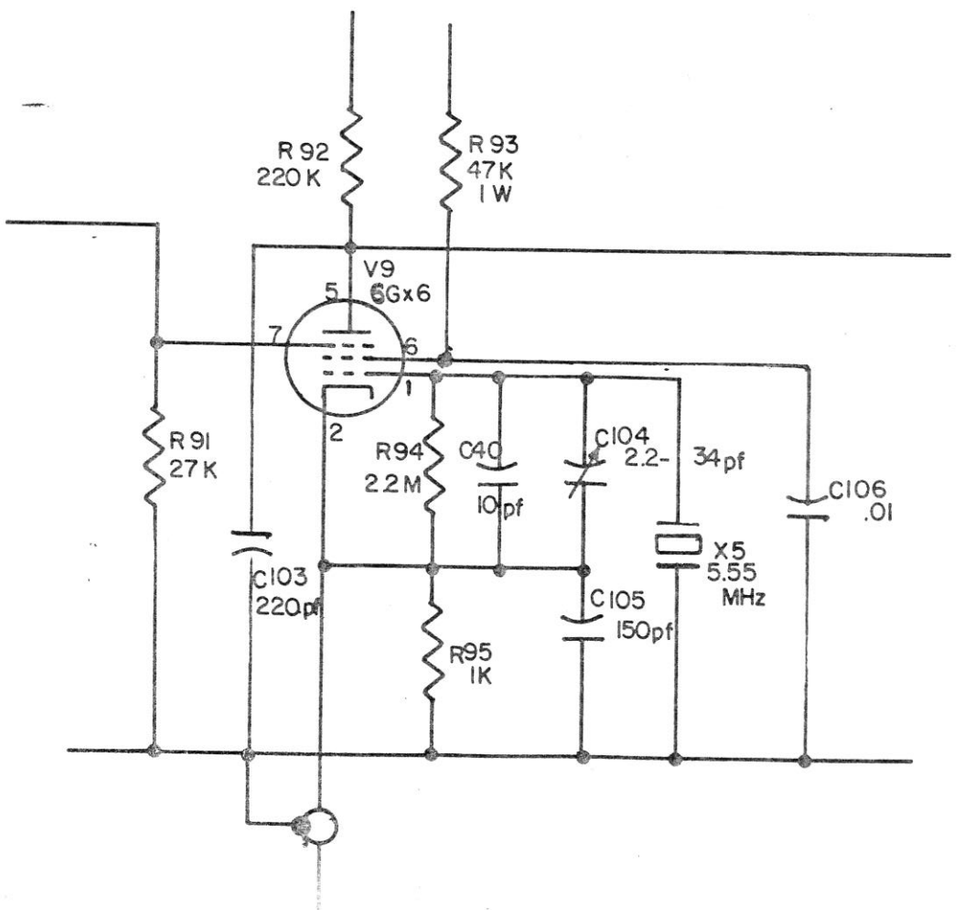
7.6 MR-1 Value:

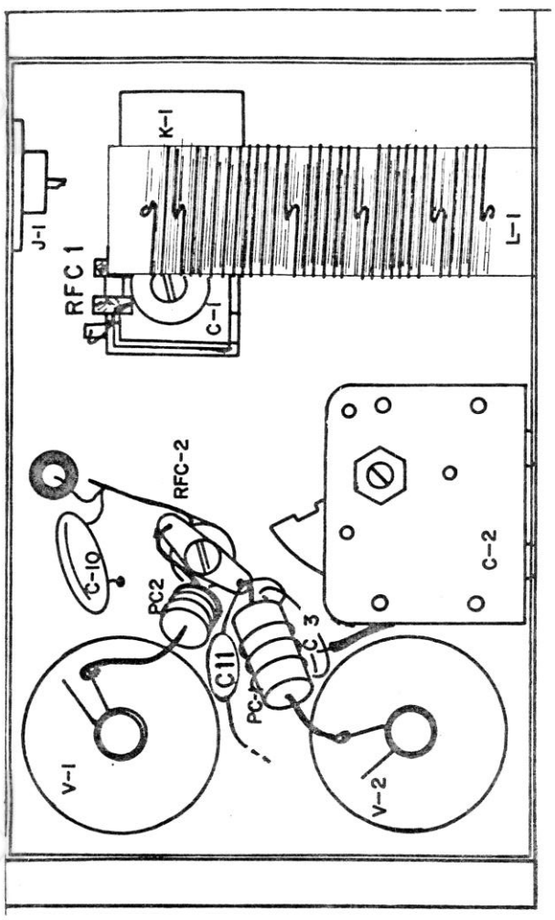
If you find that the recommended value of MR-1 gives too little or too much output power this value may be changed. Reducing the value of MR-1 will increase output power. By increasing the value of MR-1 you will reduce the output power.

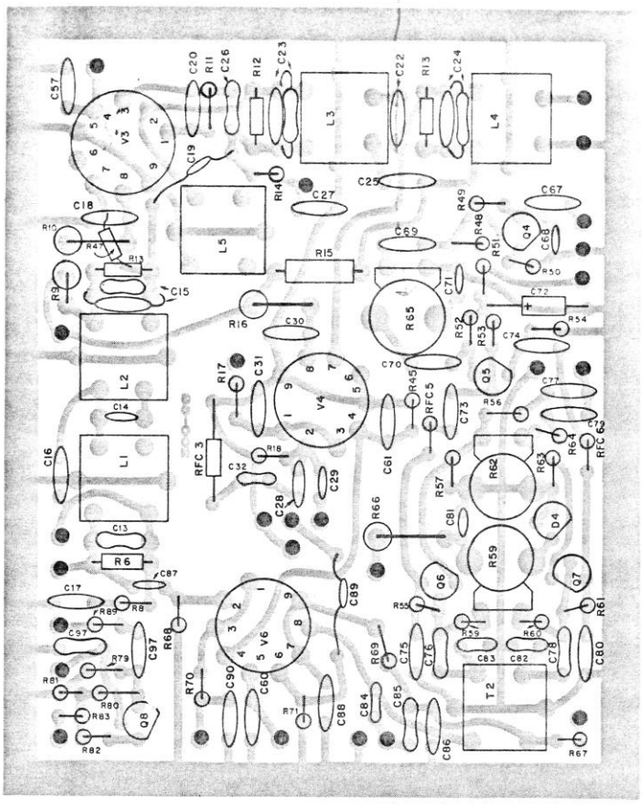
It is recommended that the proper value of MR-1 for 40 W output be determined before installation. This can be determined with a resistance substitution box. Because of circuit characteristics the recommended value may not be correct for your transceiver and a higher or lower value may be necessary.



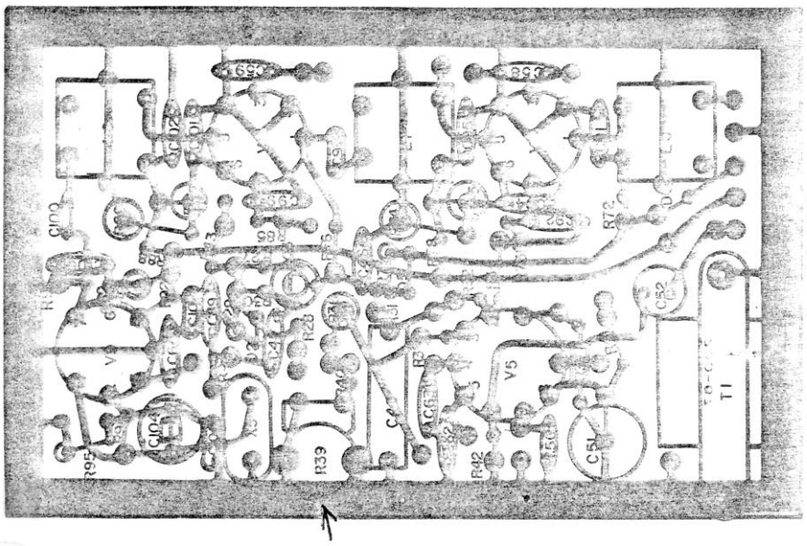
CIRCUIT DIAGRAM OF COMPONENTS AFFECTED



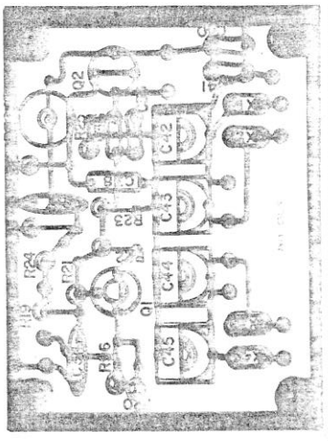




R.F. PC BOARD



IF PC BOARD

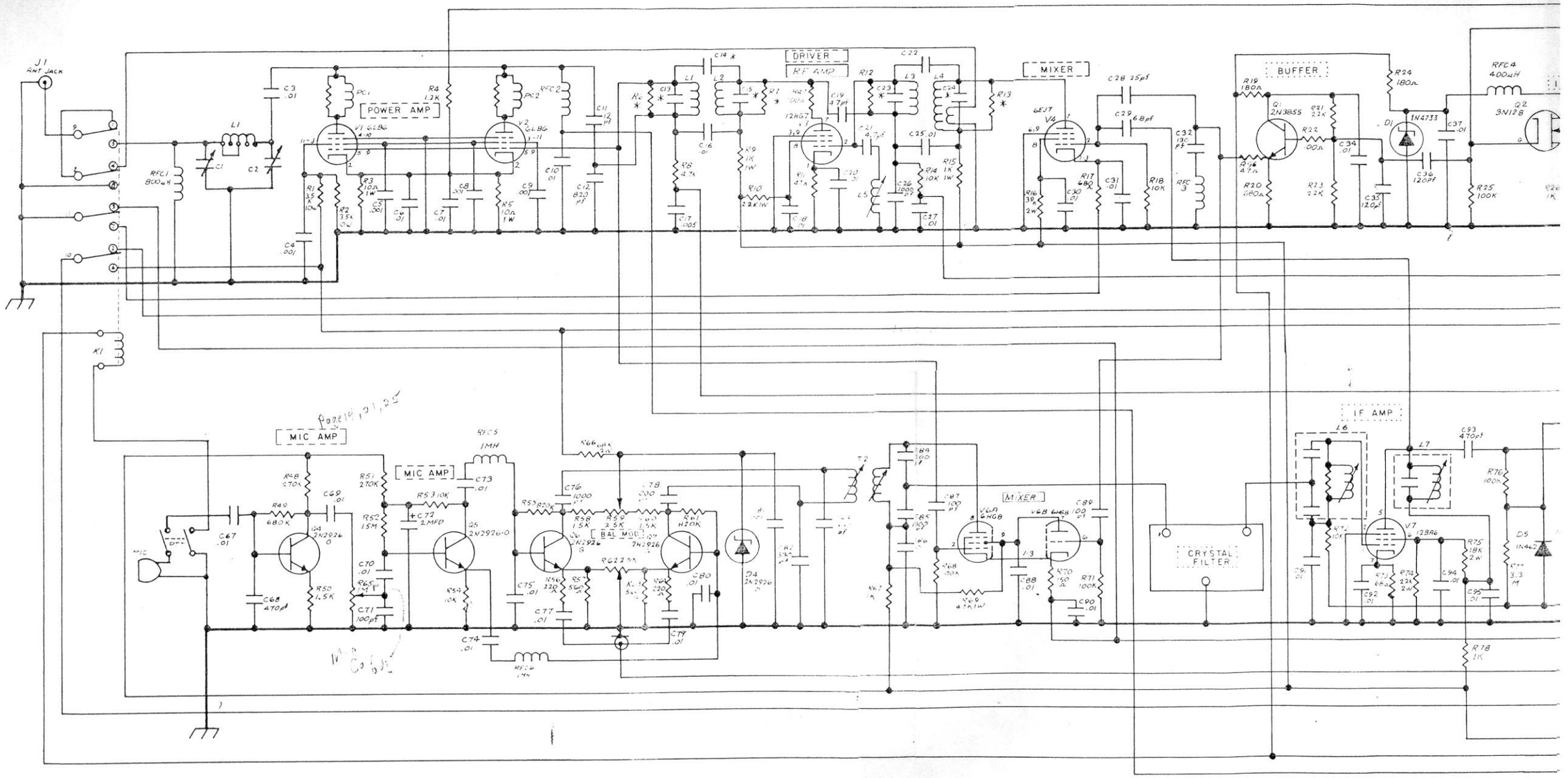


HF OSCILLATOR BOARD

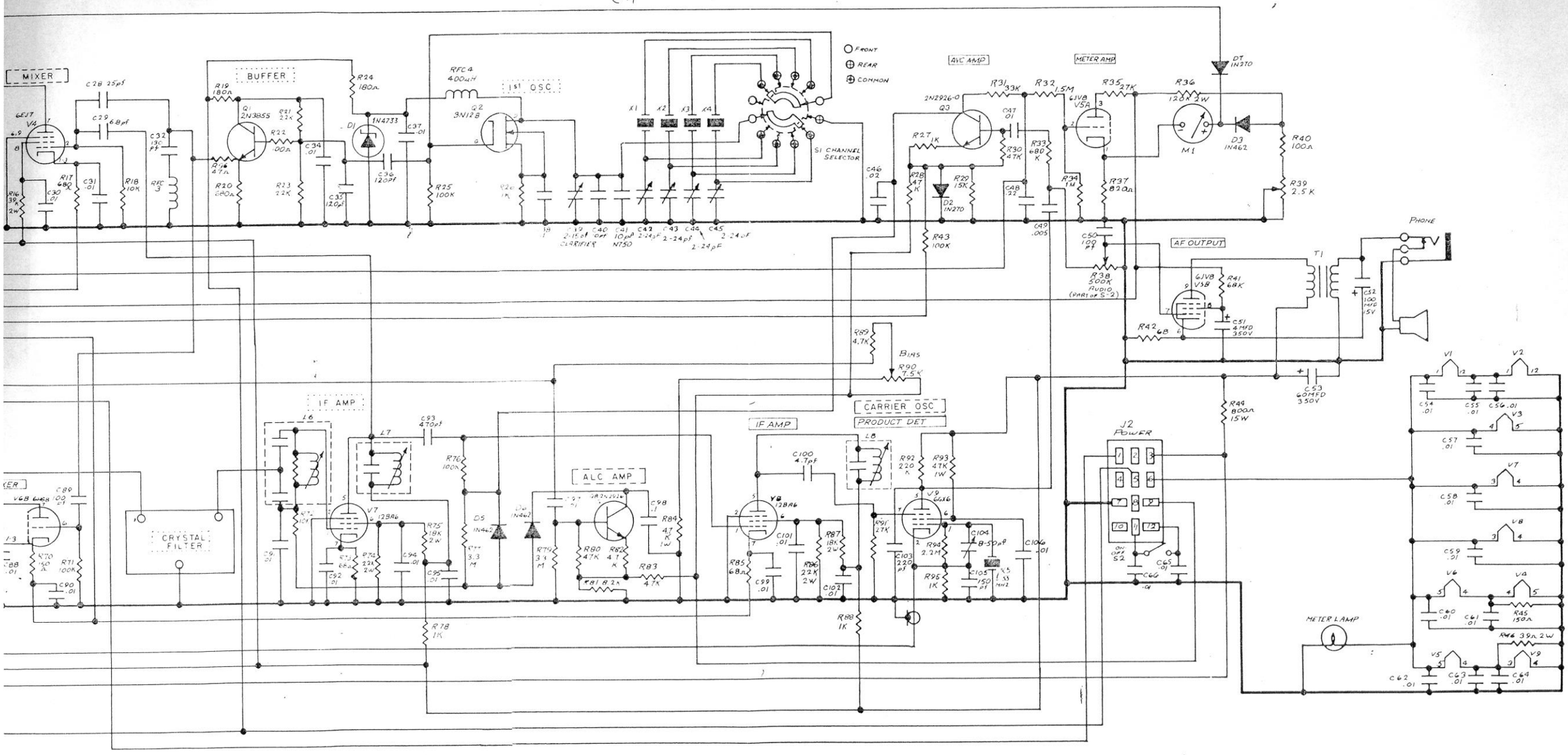
Meter adj

Component and Circuit Board Layout

COMM-1C SSB TRANSCEIVER



MM-1C SSB TRANSCEIVER



NOTE ALL RESISTORS ARE 1/2 WATT, UNLESS OTHERWISE NOTED
UNMARKED CAPACITORS ARE MFD